e-NET TCP/IP Converters

E-P132
Operation Manual
for
8051 Series

First Edition, March 2005

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1
Introduction

KSH International Co., Ltd. is providing new ways of connecting legacy serial devices to a Local Area Network (LAN) or Wide Area Network (WAN). e-NET TCP/IP converters are designed to operate serial ports over 100Mbit/s Ethernet networks. The data is transmitted via TCP/IP protocol. Therefore control is available via Ethernet, Intranet and Internet. e-NET TCP/IP converters are packaged in a steel case well suited for industrial environments. All serial ports operate in common RS-232 mode , industrial RS-422 and RS-485 modes configuration.

e-NET TCP/IP converter series is a low-cost, high performance design. By careful selecting high quality with competitive prices components in the world, e-NET products made network connectivity possible with affordable cost for virtually all kinds of devices.

The 8051 Series of e-NET TCP/IP converters consists of 2 models: E-P132-M (1 port for RS-232/422/485) is a module product for developing purpose by customers. This operation manual will guide you step by step for the various functions of the e-NET TCP/IP converter.

The following topics are covered in this chapter:

- **Overview**
- **Block Diagram**
- **Product Features**
- **Product Specifications**

Overview

e-NET TCP/IP converters are designed to make your industrial serial devices Internet ready instantly. 8051 Series of e-NET TCP/IP converters makes them the ideal choice for connecting your RS-232 or RS-422/485 serial devices—such as PLCs, meters, and sensors—to an IP-based Ethernet LAN, making it possible for your software to access serial devices anywhere and anytime over a local LAN or the Internet.

8051 Series converters ensure the compatibility of network software that uses a standard network API (Winsock or BSD Sockets) by providing TCP Server Mode, TCP Client Mode, and UDP Mode. And thanks to 8051 Series' Virtual COM driver, software that works with COM port can be set up to work over a TCP/IP network in no time. This excellent feature preserves your software investment and lets you enjoy the benefits of networking your serial devices instantly.

8051 Series converters support manual configuration via the handy web browser console and many protocols including TCP, IP, UDP, HTTP, DHCP, TELNET, and ARP. They are the best solution to network your serial devices.

Package Checklist

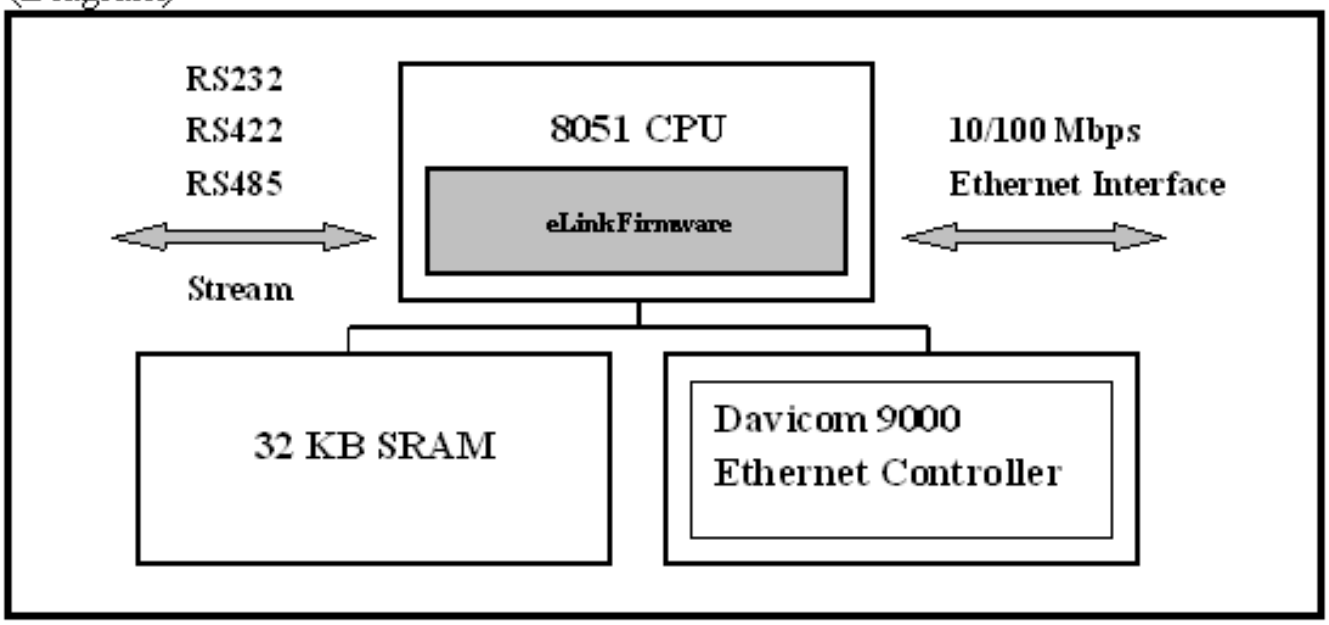
8051 products are shipped with the following items:

- 1 unit of e-NET TCP/IP converter
- 1 unit of Power Adaptor (9V DC, 500mA)
- Documentation & Software CD
- Quick Installation Guide

NOTE: Notify your sales representative if any of the above items is missing or damaged.

Block Diagram

(Diagram)



Low-cost devices usually are equipped with low speed processors and limited memories. In reality, they are neither having the capability nor practicality to manage complicated network TCP/IP protocols. 8051 Series is a low cost while providing high performance network solution by converting data stream between network TCP/IP and popular serial port signals. In stead of processing TCP/IP packets directly, devices need only deal with those interface signals, which greatly simplifies the complexity of TCP/IP network in linkage.

Product Features

- **Data Conversion between RS-232/422/485 and Ethernet**
  Convert serial device (RS-232, RS-422, RS-485) data/signal into the TCP/IP package data/signal and send them out with the Ethernet DataStream; or convert the TCP/IP package data/signal into serial device data/signal.

- **Digital I/O Activating (For OEM only)**
  Convert the sensors' statuses (the sensors are connected to the 8051 Series converters) into the TCP/IP package data and send them out with the Ethernet DataStream; or use the TCP/IP package data to activate/deactivate the specified digital outputs.

  Note: This function is for OEM only. Please contact your sales representative for further information.

- **Dynamic IP Configuration**
  Support DHCP client mode, simplifying network address configuration and management.

- **Dual LAN Speed**
  Support 10/100 Mbps Ethernet, auto-detected.

- **Server / Client Dual Modes**
  8051 Series can be configured as network server or network client. In the client mode, it can be installed in network which is protected by NAT router or firewall, without the need of a real IP address.

- **Web-based Setup**
  Parameters setup is based on HTTP protocol by using standard browsers (IE and Netscape). No special software would be required.

- **Built-in Security Control**
  Protected by both setup password and access password to prevent intruders.

- **Remote Reprogramming**
  Firmware can be reprogrammed directly via Ethernet network to keep up with latest network standards.

Product Specifications

- CPU : 8-bits 8051 , 36 MHz
- RAM : 32K Bytes SRAM
- ROM : 64 K Bytes
- Ethernet
  - Port Type : RJ-45 Connector
  - Speed : 10 /100 M bps (Auto Detecting)
  - Protocol : ARP, IP, ICMP, UDP, TCP, HTTP, DHCP
  - Mode : TCP Server/Client ; UDP Client
  - Setup : HTTP Browser Setup (IE & Netscape), RS-232 Console
  - Security : Setup Password & Connecting Password
  - Protection : Built-in 1.5KV Magnetic Isolation
- Serial Port
  - No. of Ports : RS-232 / RS-422/RS-485 * 1 Port
  - Port Type : DB9 male
  - Speed : 300 bps～115.2k bps
  - Parity : None , Odd , Even
  - Data Bit : 7 , 8
  - Stop Bit : 1 , 2
  - RS-232 Signals : Rx , Tx , GND , RTS , CTS , DTR , DSR , DCD
  - RS-422 Signals : Rx+ , Rx- , Tx+ , Tx- (Surge Protection)
  - RS-485 Signals : Data+ , Data- (Surge Protection)
  - Built-in RS422/RS485 Terminal Resistor
- Digital I/O Port

  TTL Digital I/O * 7
- 15KV ESD for all signal

- Watch Dog Function
- Firmware On-line Updated Via Ethernet
- Power : DC 9 – 12 V , 500mA
- LED Lamp : Model E-P132

  PWR (Green)

  DATA (Red-Blink during data transferring and receiving)

  LAN (Red for 10 Mbps ; Green for 100 Mbps)

  SYS (Red-Blink)
- Environment :

  Operating Temperature : 0℃～50℃

  Storage Temperature : -10℃～70℃

  Humidity :
- Dimensions : E-P132 : 90 * 90 * 25 mm (W * D * H)
- WEIGHT : E-P132 : 110 gm
- RoHS :Compliant with RoHS
- Regulatory Approvals :

  EMC : FCC Class A, CE Class A
- WARRANTY : 1 year

2

e-Net TCP/IP Converter Description

Product Panel Views

Top Side

Right Side

Left Side

Rear Side

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LED Indicators

PWR (Green)：

Power indicator (When the power is on, the LED will be on.)

DATA (Red)：

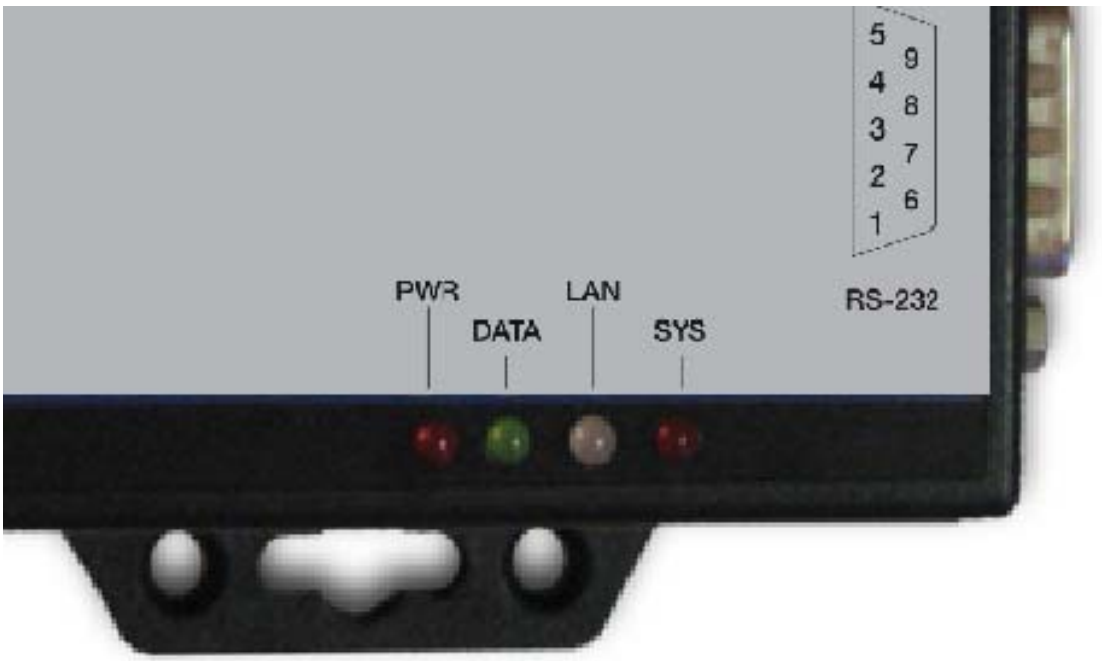
Data sent & received indicator (When data are sending and receiving to the network, the LED will blink.)

LAN (Red/Green)：

Network signal indicator (When the LAN signal is detected in 10Mbps, the LED will be on in red color. When the LAN signal is detected in 100Mbps, the LED will be on in green color.)

SYS (Red)：

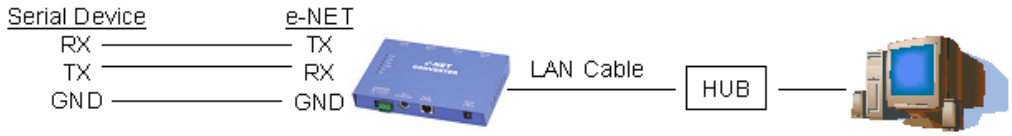
Device statues indicator (When e-NET TCP/IP converter is operated in normal statues, the LED will blink once per second.)



Wiring Architecture

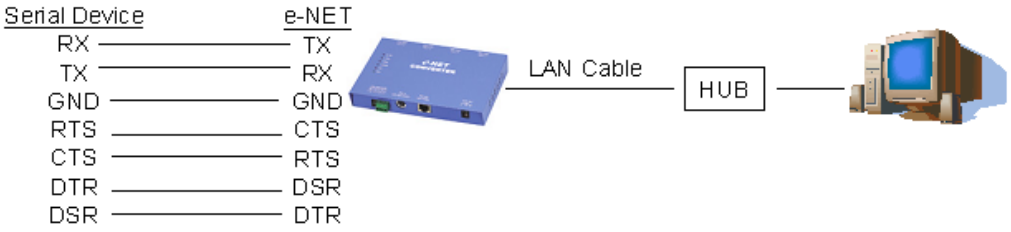
RS-232 Wiring Architecture

RS-232 Wiring



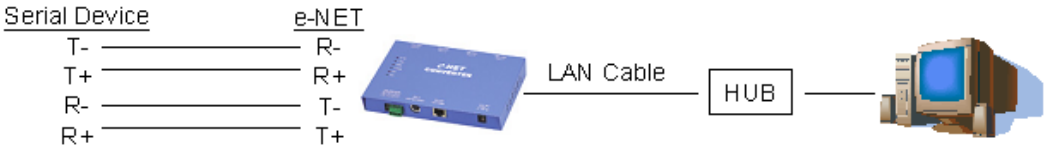
RS-232(RTS/CTS) Wiring

RS-232(RTS/CTS , DTR/DSR) Wiring

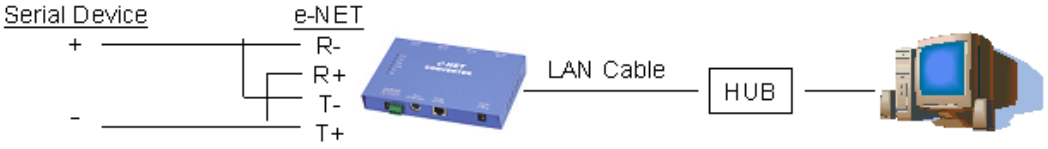


RS-422/RS-485 Wiring Architecture

RS-422 Wiring



RS-485 Wiring



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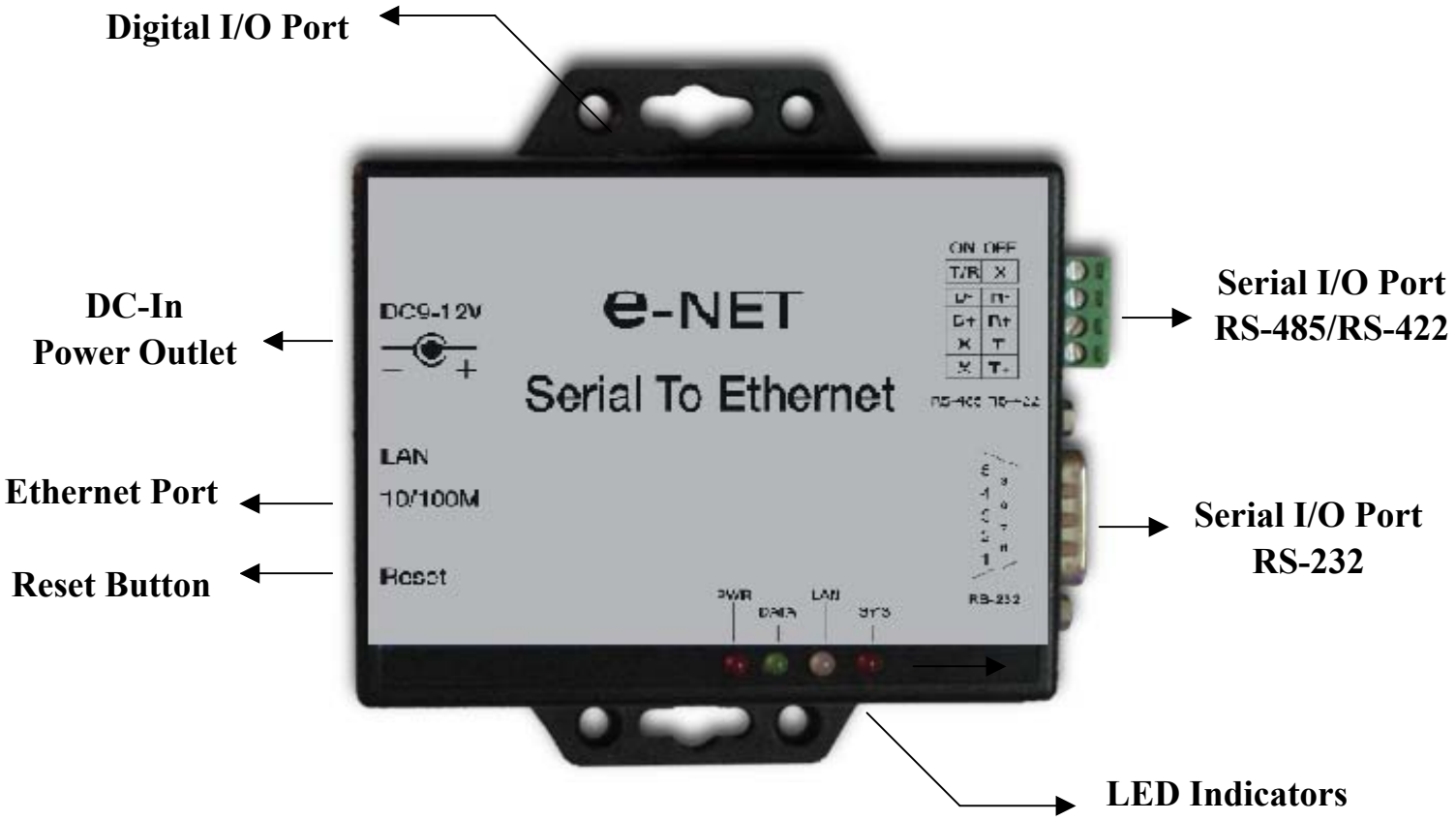
3

e-Net TCP/IP Converter Installation



Power Supply

The e-Net TCP/IP converter is powered by a single 9Vdc (inner positive/outer negative) power supply and 500mA of current. A suitable power supply adapter is part of the packaging. Connect the power line to the power jack at the left side of e-Net TCP/IP converter and put the adapter into the socket. If the power is properly supplied, the “PWR” green color LED will be on.

Ethernet Port

The connector for network is the usual RJ45. Simply connect it to your network switch or Hub. When the connection is made, the green or red LAN LED indicator will light.

When data traffic occurs on the network, red DATA LED indicator will blink during data transferring and receiving.

A 100Mbit connection causes the LAN LED indicator will light in green color. If a 10Mbit connection causes the LAN LED indicator will light in red color.

Serial I/O RS-232/RS-422/RS-485

Connect the serial data cable between the converter and the serial device. Follow the parameter setup procedures to configure the converter (see the following chapters).

Digital I/O

Transforming the sensor which connecting on the e-Net TCP/IP converters equipment statuses into the TCP/IP package data and send out by the Ethernet DataStream (The e-Net TCP/IP converters must indicate the IP address and Com Port) or activating the indicated Digital output (Remote WinSock must indicate the e-Net TCP/IP converters)Connect the data wires between the e-Net TCP/IP converters and the RS-485/RS-422 device. Follow the parameter setup procedures to configure the converter (see the following chapters).

Dip Switch

The purpose is for compensating signal attenuation in long distance connection at RS-485/RS-422 I/O. If the switch 1 & 2 are set in “ON” position, the signal compensation

will be activated. To disable the function, just push switch 1 & 2 to opposite position.

Reset Button

If by any chance, you forget the setup password, or have incorrect settings making e-Net TCP/IP converter inoperable. First, turn off the power. Second, use any point tip to push this button and hold it to turn on the power at the same time for 5 second. All the parameters will be reset to the factory default.

When you finish the steps mentioned above and the LED indicators are as shown, the converter is installed correctly. You can use the Setup Tool “ETM.exe” to setup the IP Address, Subnet Mask, and the MAC Address. To proceed the advanced parameter setup, please use a web browser (IE or Netscape) to continue the detailed settings.

4

e-Net TCP/IP Converter Configuration

Initial IP Configuration

When setting up your converter for the first time, the first thing you should do is configure the IP address. This chapter introduces the method to configure the device server's IP address. For more details about network settings, see the Network Settings section in Chapter 4, "Web Console Configuration".

The following topics are covered in this chapter:

- **Device Management Utility**
- **Menu "View"**
- **Menu "Config"**

Device Management Utility

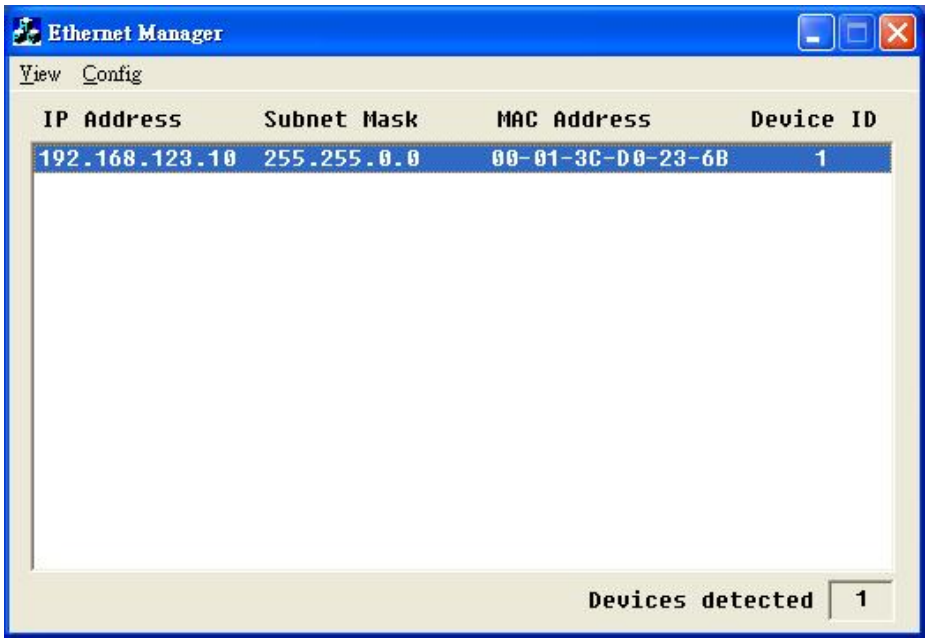
On PC we provide a Device Management Utility named ETM.exe which is an executable program in Windows 32 bit environments. ETM Setup Tool is used to detect and setup the installed converters. It uses UDP broadcast packets to query and configure converters on the network.

When you activate the tool, it will detect the existence of the installed converters and depict the converters' status such as IP address, Subnet Mask, MAC Address, and Device ID (see Figure 4.1). The Setup Tool only can setup one converter at a time. Thus if there are more than one converter on the network, please shut down or disconnect other converters. Otherwise the ETM.exe can not detect the converter.

Due to the nature of broadcast UDP packets, ETM has following characteristics:

- Broadcast packets are not limited by subnet. Even if the IP address of the converters and the computer running ETM do not belong to the same subnet, it still works fine.

- Broadcast packets can not pass routers. ETM can only be used to monitor devices with computer running ETM in the same segment of local area network.



(Figure 4.1)

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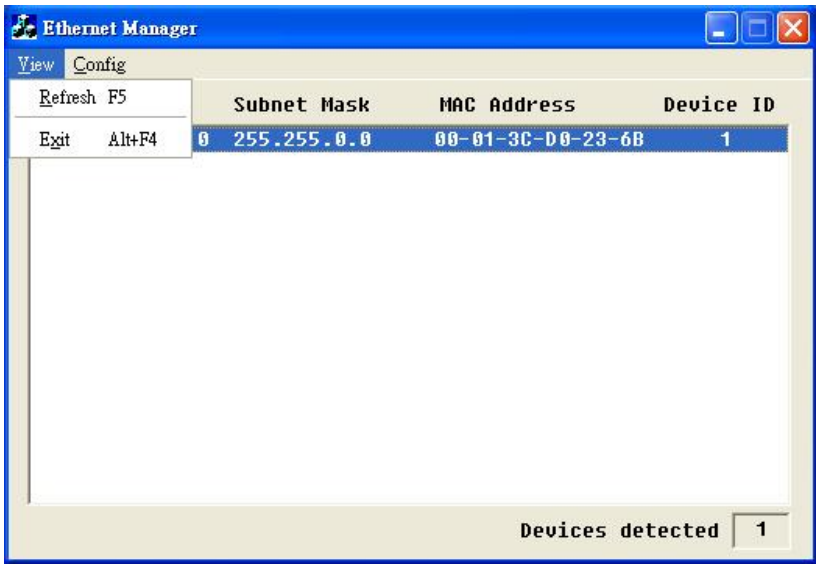
Menu “View”

- View -> Refresh F5

  Refresh the status. ETM will send another query to get updated information.(see Figure 4.2).

  Note: Always run the “View-> Refresh” after any data change.



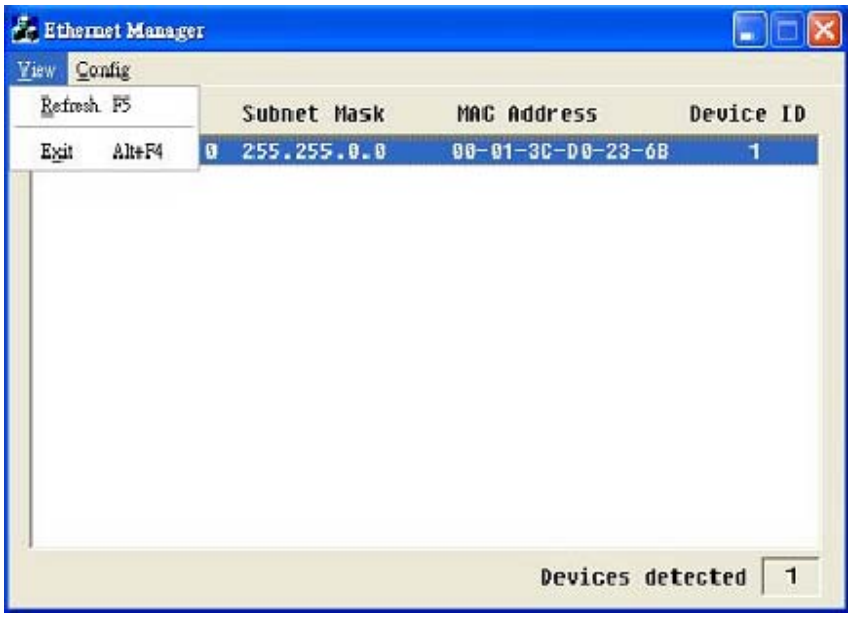
(Figure 4.2)

- View -> Exit Alt+F4

  Exit from the program (see Figure 4.2).

Menu “Config”

- Config -> IP Address (see Figure 4.3)



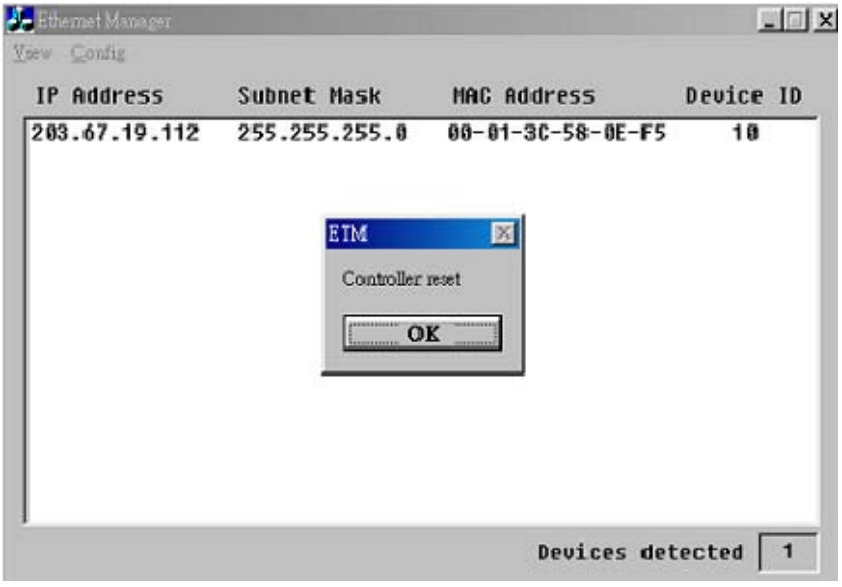
(Figure 4.3)

Press ENTER or select [IP Address] in the [Config] menu, a dialog will be shown (see Figure 4.4).

Note : Because ETM uses broadcast UDP packets, for the sake of security, it allows configuration **only when device's setup password is empty**.

(Figure 4.4)

Assign an IP Address with the same Subnet Mask of your computer, avoiding any IP conflict with other network devices.
When you **press [Ok]** button, the IP address will be refreshed in 2~3 seconds. (see Figure 4.5).



(Figure 4.5)

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Web Console Configuration

In addition to basic IP address and subnet mask, specific device settings can be set through HTTP protocol with popular browsers, e.g. Internet Explorer, Netscape, etc. Setup of the converters is as easy as surfing on WWW, no special software will be required. **Press [Alt]+[Enter] or select [Device Settings] in the [Config] menu, will open a new window in browser to login into the device**. Alternatively, if the IP address of the converter is already known, you can connect to the converter directly by providing its IP address in the URL field of browsers.

The following topics are covered in this chapter:

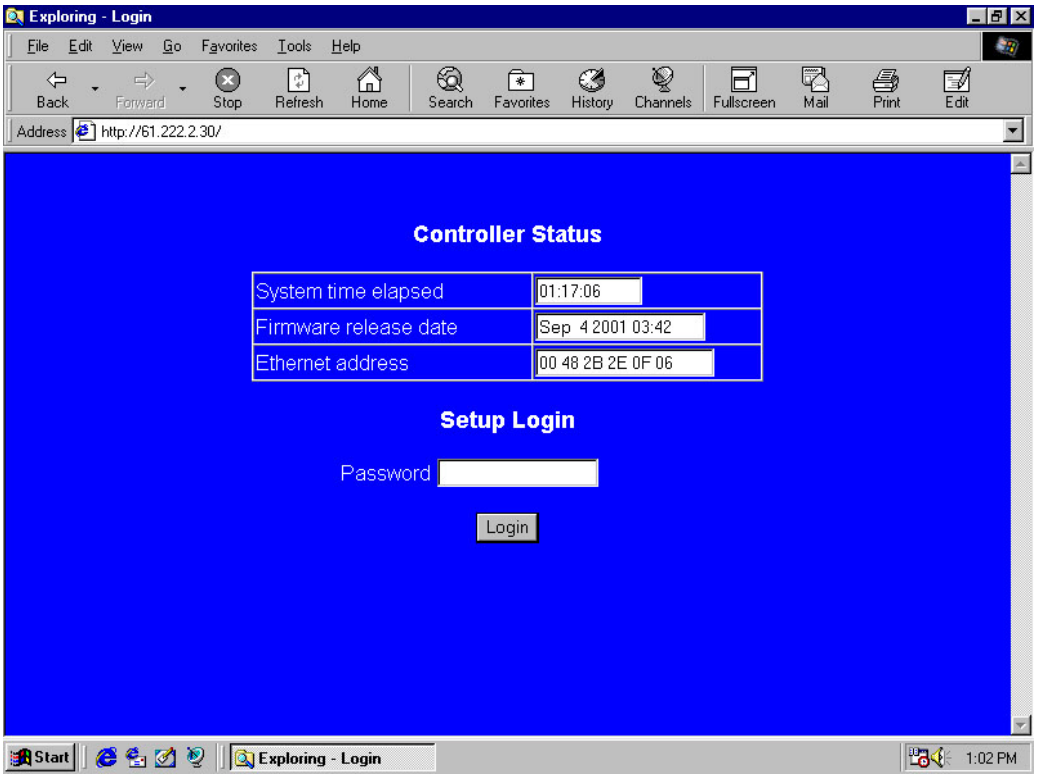
- **Controller Status**
  - **The Login Page**
  - **Field Description**
- **Controller Setup**
  - **The Setup Page**
  - **Field Description**
- **Controller Updated**
- **Factory Default Setting**

Controller Status

The Login Page

Setup of e-NET TCP/IP converter is as easy as surfing on WWW, no special software will be required. Popular Browsers, such as IE, or Netscape, can easily do the setup process. In the browser URL field, set the IP address of device directly, To enter the "Controller Status" page, please follow the steps below.

- Open your browser. This chapter will use IE as an example.
- In the browser URL field, type the IP address of the converter directly and press ENTER. (The IP address is what you set using the Device Management Utility.)
- The "Controller Status" page will be shown (see Figure 5.1).


Exploring - Login
File Edit View Go Favorites Tools Help
Back Forward Stop Refresh Home Search Favorites History Channels Fullscreen Mail Print Edit
Address http://61.222.2.30/
Controller Status
System time elapsed 01:17:06
Firmware release date Sep 4 2001 03:42
Ethernet address 00 48 2B 2E 0F 06
Setup Login
Password
Login
Start
Exploring - Login
1:02 PM

(Figure 5.1)

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Field Description

- **System time elapsed**

  The time elapsed since start of this device in [Day Hour : Minute : Second] format. This information can be useful in identifying the reliability of system.

- **Firmware version**

  e-NET TCP/IP converter firmware is identified by date code. This information will be required in looking for technical support.

- **Serial number**

  e-Net TCP/IP converter is an unique MAC (Media Access Control) address used by Ethernet in **hex format, 6 digits.**

- **Password**

  This field is the administration password for authentication. Factory default is "**empty**". However, it is not recommended to leave it empty in field operation. If you could not login, it means you have to key in the password. If you do not know the password you can turn off the power and then use any point tip to push "Reset" button and hold it to turn on the power at the same time for **5 seconds.** The password will be reset to the factory default as **"empty".**

  e-Net TCP/IP converter uses the same password protection mechanism commonly used in Windows NT or UNIX. If there are more than **"3 consecutive failures"** in password check during login, the login function will be disabled for **"15 minutes"**. During this 15 minutes period, even if you

supply correct password, login will not proceed. This prevents intruders from finding the password by computer generated program.

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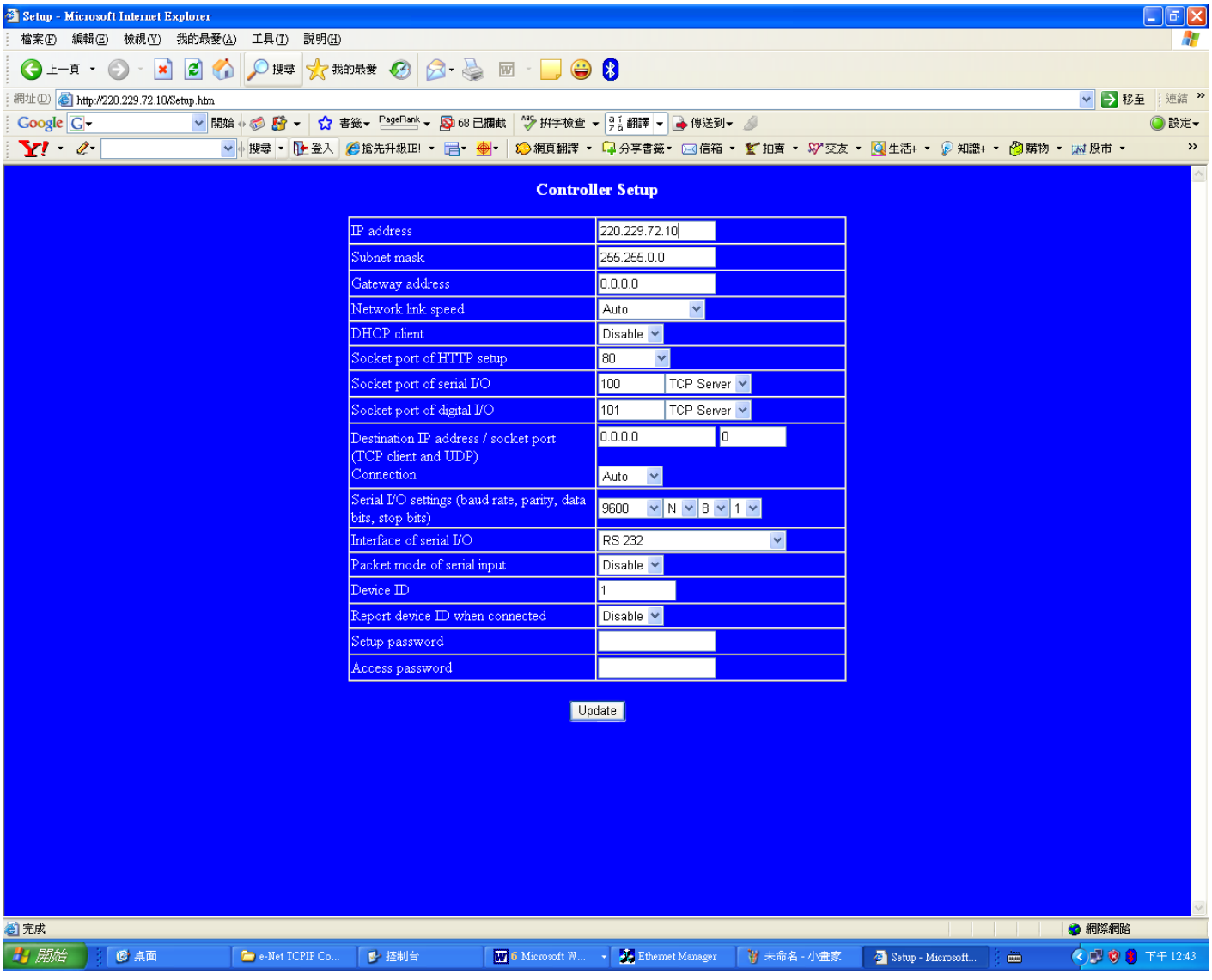
Controller Setup

- The Setup Page

  Type the correct password in the “Password” field and click the [Login] button in the “Controller Status” page, then the “Controller Setup” page will appear (see Figure 5.2).

  Note: If you forget the password or can’t login successfully, please contact the manufacturer directly.



(Figure 5.2)

- **Field Description**

  - **IP Address**

    The IP address of e-Net TCP/IP converter, 4 digits separated by '.' Don’t let it conflict with the other devices on the network.

    If DHCP client mode is enabled and there's a DHCP server on the network, this field will be assigned by DHCP server automatically.

  - **Subnet mask**

    Subnet mask of the network e-Net TCP/IP converter has connected to. “255.255.255.0” is usually used for small network, “255.255.0.0” for larger network, 4 digits separated by '.'

    If your IP address is provided by an ISP or the internal network administrator, please inquire of them that information and type it correctly.

    If DHCP client mode is enabled and there's a DHCP server on the network, this field will be assigned by DHCP server automatically.

  - **Gateway address**

    Gateway or Router IP address. 'Gateway' is a device which connects local network to external network. If you need to communicate with other networks or your device owns a real IP address on the internet, please inquire of them that information and type it correctly. If there's no gateway on the network, just leave it as “0.0.0.0”.

    If DHCP client mode is enabled and there's a DHCP server on the network, this field will be assigned by DHCP server automatically.

- **Network link speed**

  Ethernet physical link speed. "Auto" means the speed is automatically selected by the converter. You can also specify "10Mbps" or "100Mbps" to match the speed of the HUB.

- **DHCP client**

  DHCP client mode could be enabled/disabled statues. If DHCP is enabled, there should be a DHCP server on the network. If DHCP is disabled, [IP address], [Subnet mask], and Gateway address] should be manually assigned.

- **Socket port of HTTP setup**

  The socket port used to conduct the browser setup. Normally, HTTP protocol use TCP port "80" for communication. If the field is changed to "81", the port "80" will be reserved for user's own Web.

  To enter the browser setup page, "http://x.x.x.x:81" should be typed for socket port "81" and "http://x.x.x.x" for socket port "80", where "x.x.x.x" is the converter's IP address..

- **Socket port of serial I/O (RS-232)**

  - **Port number**

    A socket port assigned for the serial port. It's a 16-bit number , ranging from 1 to 65535. Because the numbers below 1000 are used for specific purposes (e.g. 80 is for HTTP protocol), we suggest you use the numbers larger than **1000**. Generally the port number 4660 is used for the serial communication. However you should specify different port number for each serial port.

  - **Socket type**
    - TCP Server: TCP protocol, passive open, to be connected from the TCP client**s**.
    - TCP Client: TCP protocol, active open, connect to the TCP server.
    - UDP Client: UDP protocol, connectionless

- **Socket port of digital I/O (RS-485/RS-422)**

  - **Port number**

    A socket port assigned for the serial port. It's a 16-bit number , ranging from 1 to 65535. Because the numbers below 1000 are used for specific purposes (e.g. 80 is for HTTP protocol), we suggest you use the numbers larger than **1000**. Generally the port number 4660 is used for the serial communication. However you should specify different port number for each serial port.

  - **Socket type**
    - TCP Server: TCP protocol, passive open, to be connected from the TCP client**s**.
    - TCP Client: TCP protocol, active open, connect to the TCP server.
    - UDP Client: UDP protocol, connectionless

- **Destination setting**
  - **Destination IP address**

    The server IP address and socket port would be connected in TCP Client and UDP Client mode for a certain serial port.

  - **Destination socket port**

    The server socket port would be connected in TCP Client and UDP Client mode for a certain serial port.

  - **Connection**

    The connection can be selected in 2 modes, "Auto" or "Manual".

- **Serial I/O setting**
  - **Baud rate, parity, data bits, stop bits**
    - Baud Rate: 300 ~ 115200 bps
    - Parity: None, Even, Odd
    - Data Bits: 7, 8
    - Stop Bit: 1 or 2

- **Interface of serial I/O**
  - RS232: TxD, RxD for data stream, no flow control
  - RS232 (RTS/CTS): TxD, RxD for data stream, RTS/CTS for flow control
  - RS232 (RTS/CTS, DTR/DSR): TxD, RxD for data stream, RTS/CTS for flow control. DTR for socket status, DSR for socket open/close control
  - RS485 (Half duplex): Half duplex RS-485 interface, RTS for driver enable/disable
  - RS422 (Full duplex): Full duplex RS-422 interface

- **Packet mode of serial input**

  Packet mode could be in enabled/disabled mode. If packet mode is enabled, the data input from UART will be deferred until the input buffer is full, or the converter detects a 10-character packet gap and no more character arrived. The block waiting time is extended to avoid the splitting of the complete packet.

- **Device ID**

  User assigned ID number for the converter. Available ID is "0 ~ 65535".

- **Report device ID when connected**

  In TCP mode, if this parameter is enabled, every time when the socket is connected, e-Net TCP/IP converter will immediately report its device ID in the following formats:

Serial #1	nnnnnA[LF][CR]
Serial #2	nnnnnB[LF][CR]
Digital I/O	nnnnnC[LF][CR]

  The total length is 8 bytes, where "nnnnn" is a 5-digit device ID assigned by the user; [LF] is decimal 10; [CR] is decimal 13.

- **Setup password**

  Administration password used to login the "Controller Setup" page. It may be empty or up to 15 characters long.

- **Access password**

  During socket connection, Authentication password may be empty or up to 15 characters long. If "Access password" is empty, the authentication is disabled.

Otherwise, the authentication will be conducted. If the authentication fails or no password is supplied within 10 seconds, the socket will be closed.

Controller Updated

Press “Update”] Button After you finish the detailed parameter setting. The converter will save all parameters into internal non-volatile memory and then reboot (see Figure 5.3). It takes about 5 seconds to complete the whole process, and a new login page will be presented (see Figure 5.1).

(Figure 5.3)

You can re-login and check if all parameters have been correctly saved. If everything is ok, you can close the browser now.

Note : If the domain of the converter is different from that of the computer running the browser, the login page won’t appear unless the converter’s “Gateway Address” has been correctly set.

Factory Default Setting

If by chance, you forget the setup password, or have incorrect settings making the converter inoperable, there are two ways to reset the setting and the following procedures can be used to reset all settings to factory default:

A:

1. you can turn off the power and then use any point tip to push “Reset” button and hold it to turn on the power at the same time for **5 seconds.** The password will be reset to the factory default as **“empty”.**

B:

1. Turn off the power of the converter.
2. Use a pin or any point tip to push the screw driver or any conductor to short DTR and CTS (pin 4 and pin 8 in DB9) of RS232 connector.
3. Turn on the power of the converter.
4. Remove screwed driver or conductor.

5

Setting Verification

After completing the wiring and parameter setting, we should verify if the setting is correct. This chapter will introduce how to use a single computer to test if the converter behaves well.

The operating system can be Windows 95, 98, ME, XP, 2000. The "Hyper Terminal" utility should be installed on your PC (see Figure 6.1). It can be found in your Windows installation CD.

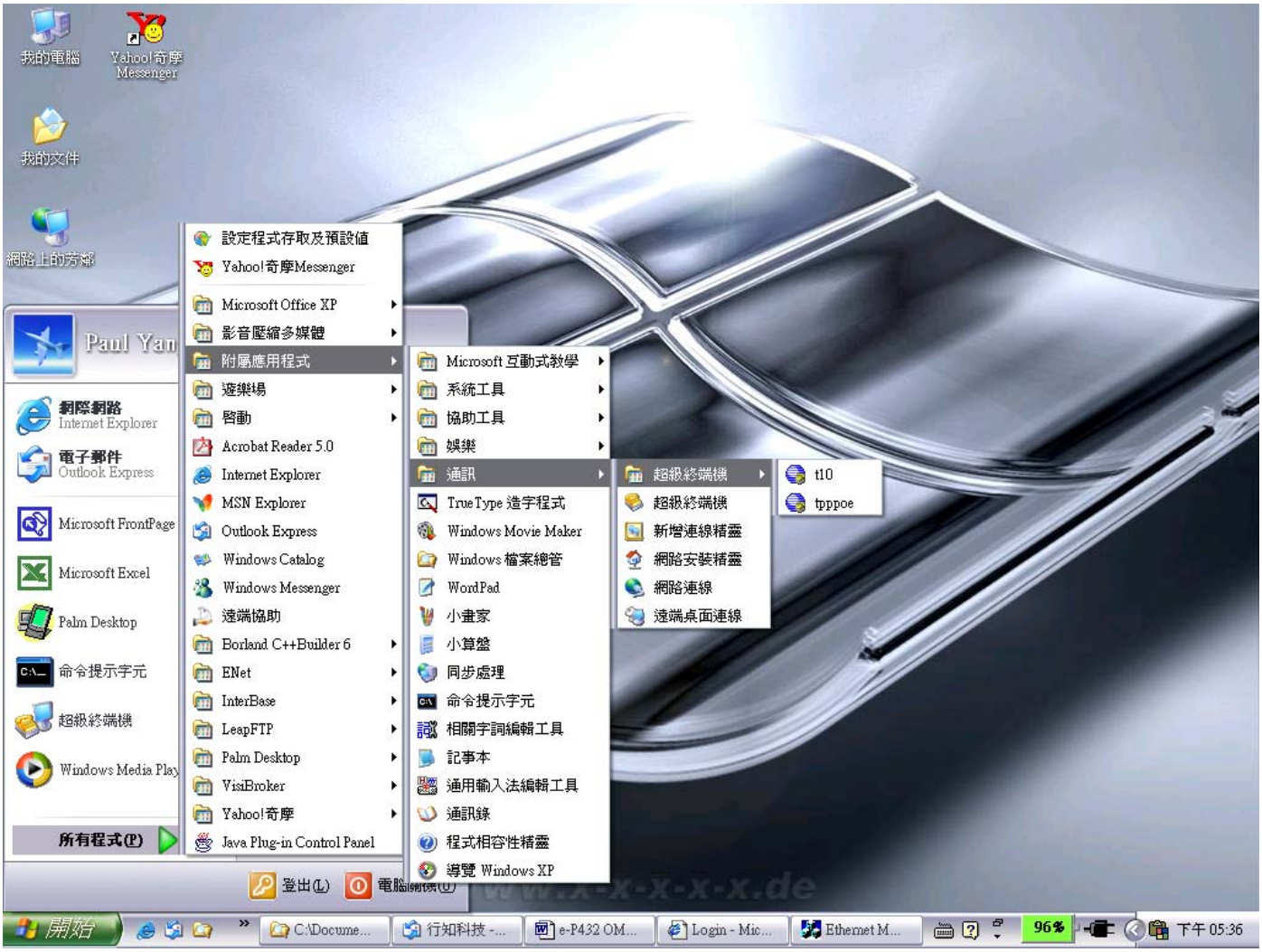
The wiring architecture is similar to "RS-232 Wiring" in chapter 3, and the "Serial Device" is replaced by the PC's COM 1. The same PC also plays the roll of the Remote Host.

The following topics are covered in this chapter:

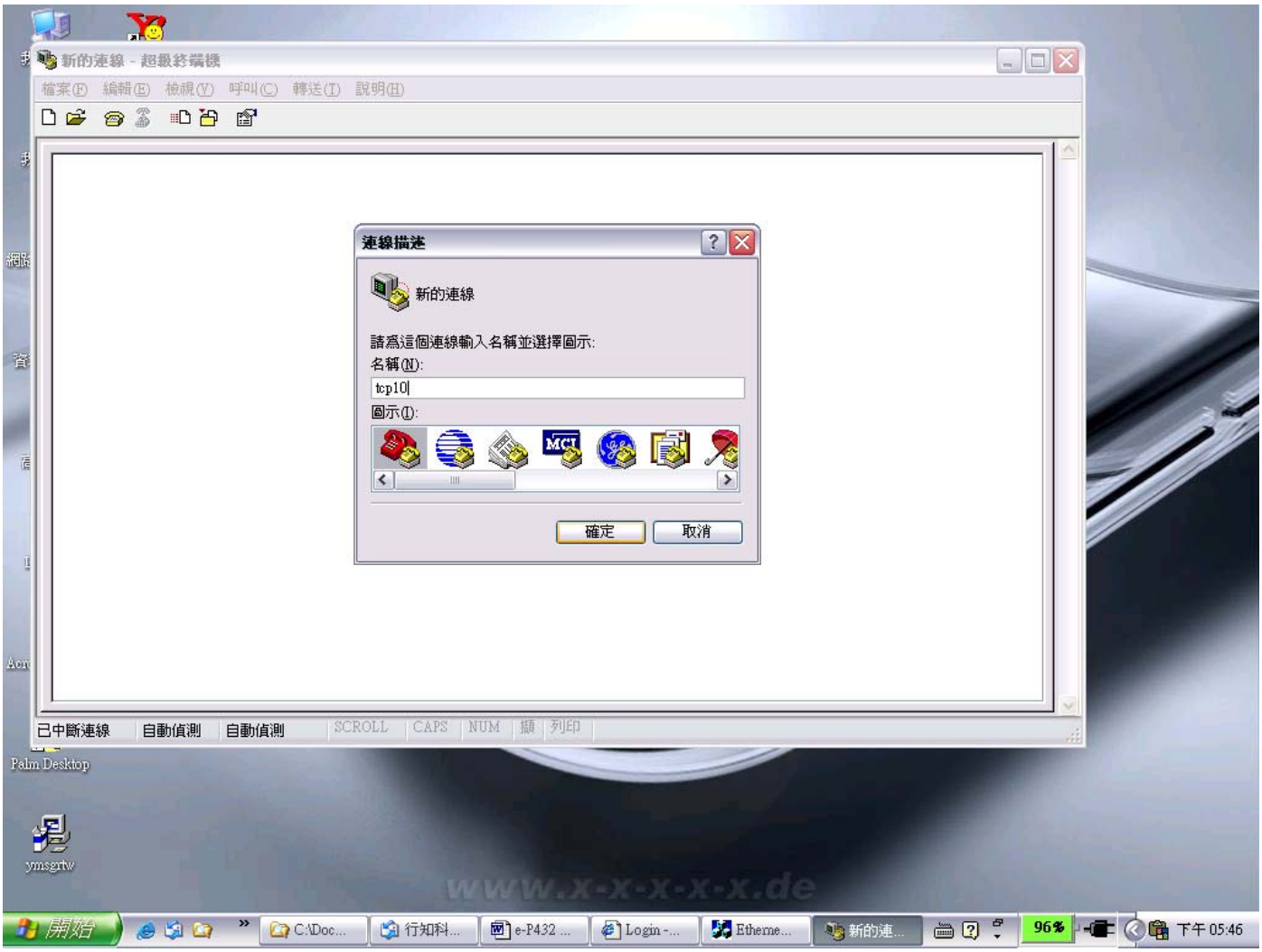
- **Hyper Terminal for TCP/IP WinSock**
- **Hyper Terminal for COM Port**
- **Data Transmission**

Hyper Terminal for TCP/IP WinSock

Initiate a Hyper Terminal from the Start Menu in Windows (see Figure 6.1), give a terminal name, choose an icon, and press “OK” button (see Figure 6.2).



(Figure 6.1)



(Figure 6.2)

Select “TCP/IP(Winsock)” option at the “Connect using:” field (see Figure 6.3).

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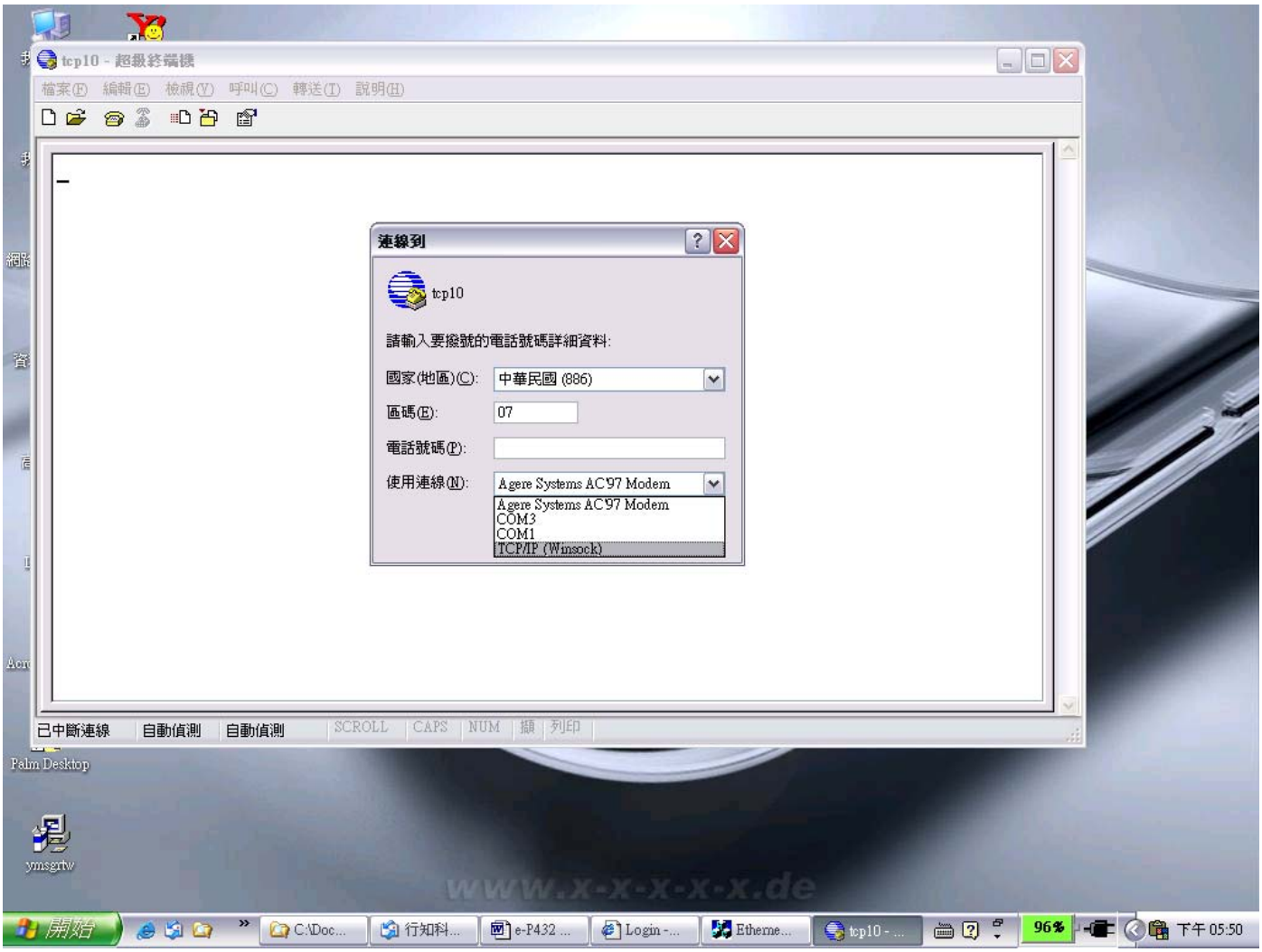

(Figure 6.3)

After “OK” button is pressed, Figure 6.4 appears. Enter the converter’s IP address (e.g. 192.168.123.10) at the “Host address:” field, and the Socket port number set for the Serial Port 1 at the “Port number:” field (e.g 4660). (The Socket type of the Serial Port 1 should be “TCP Server”.)

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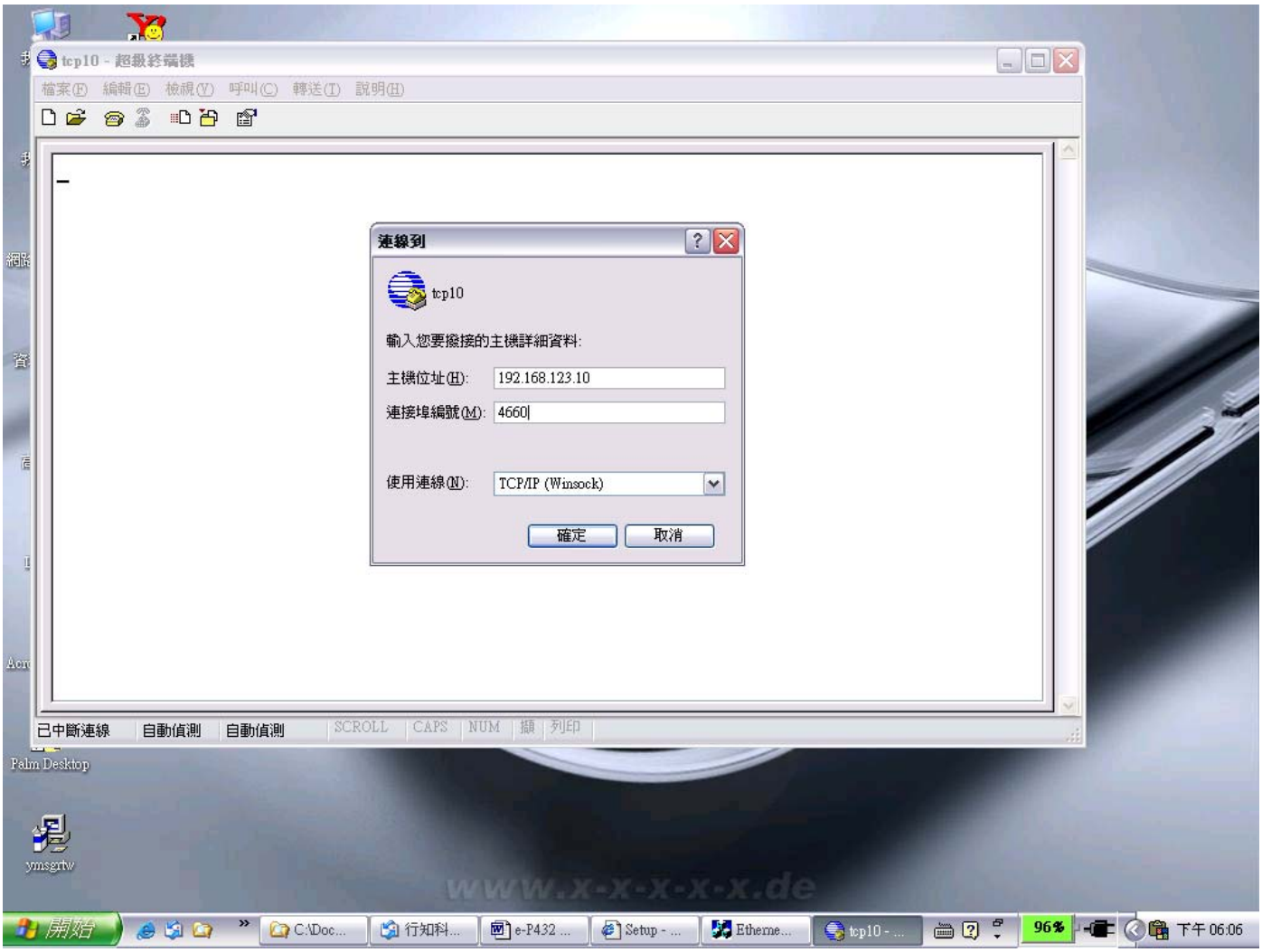
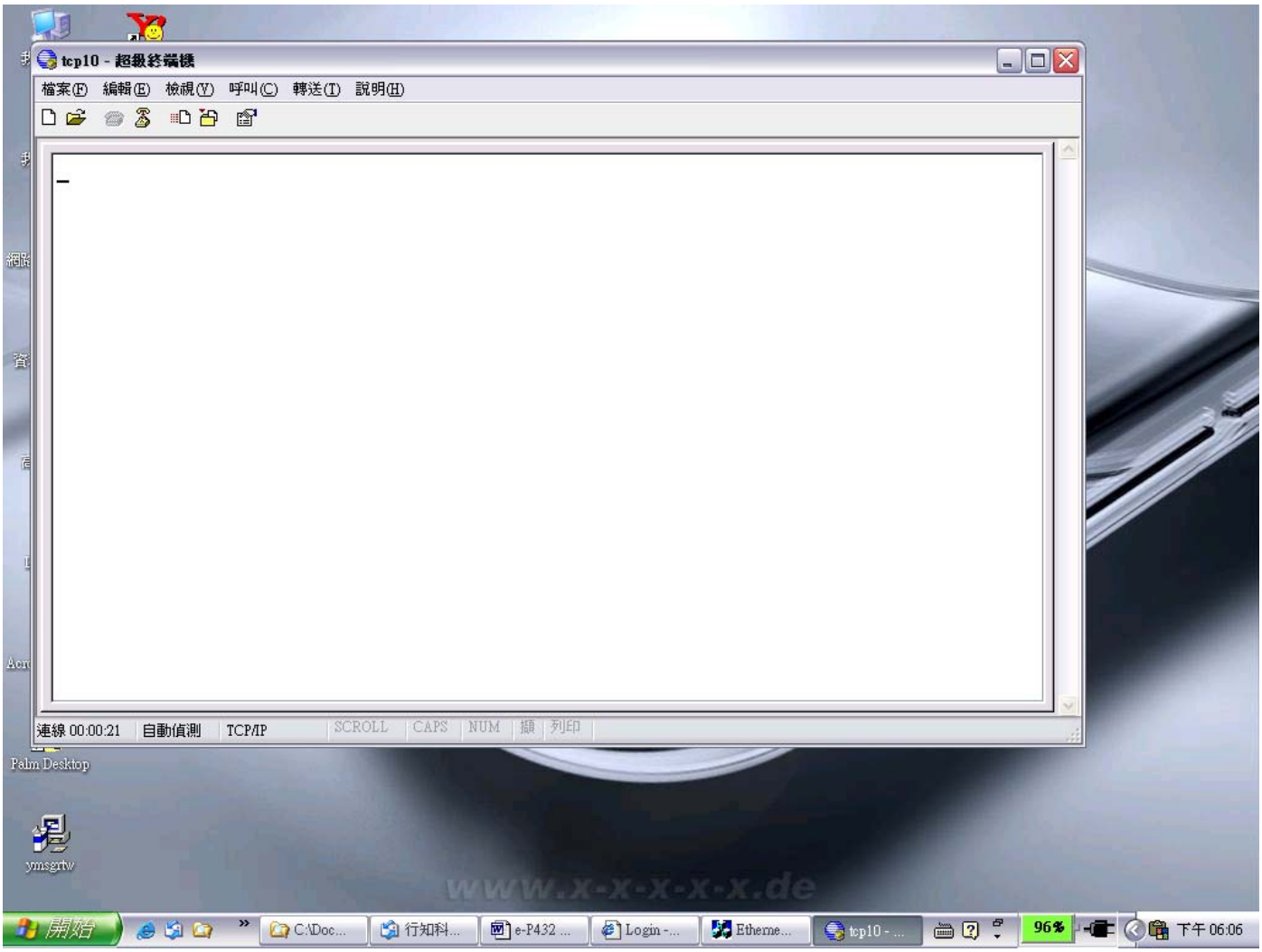


(Figure 6.4)

After “OK” button is pressed, Figure 6.5 appears. If the Hyper Terminal connects with the converter successfully, the time clock at the left lower corner “Connected hh:mm:ss” will start counting.



(Figure 6.5)

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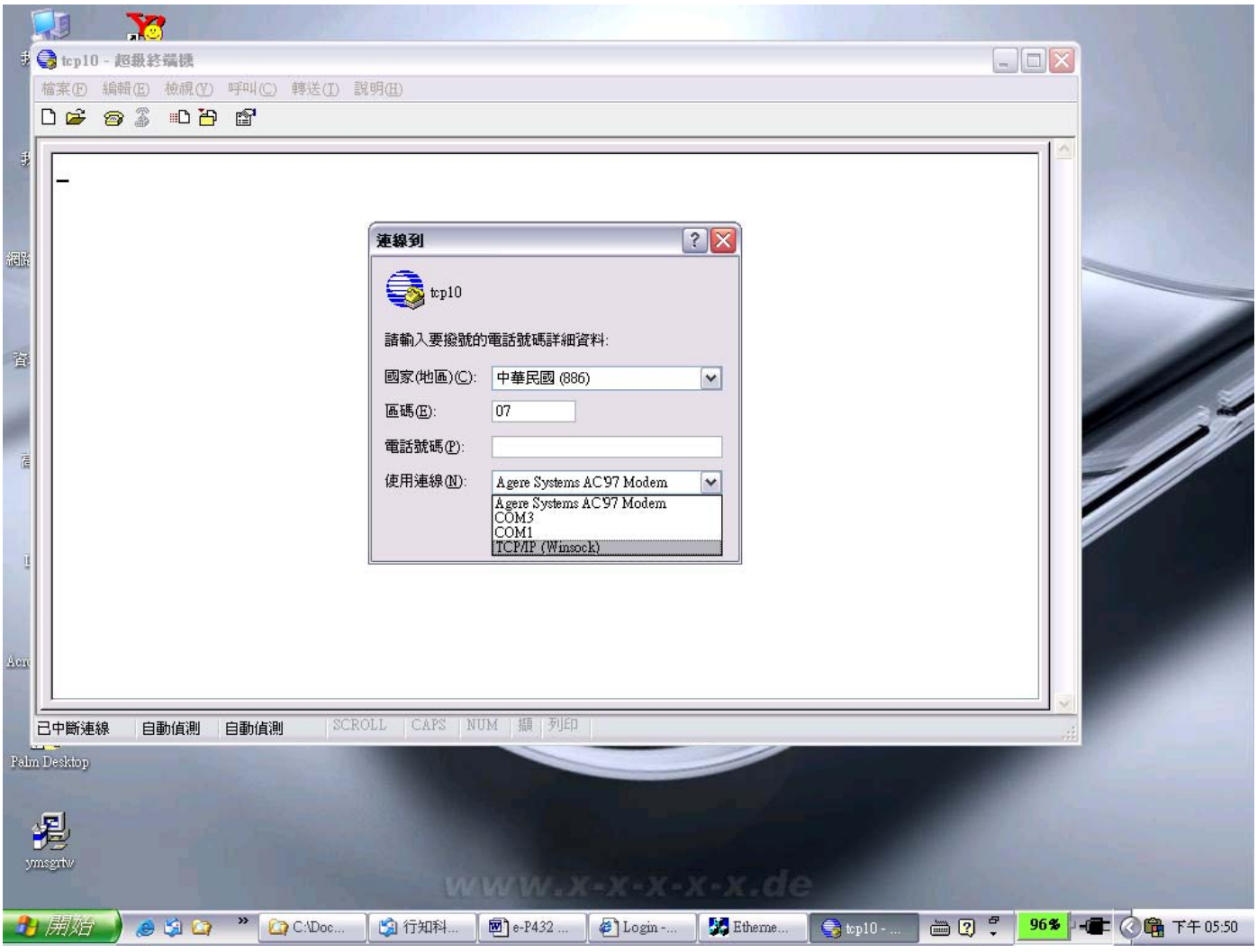
Hyper Terminal for COM Port

Initiate another Hyper Terminal as a COM Port Terminal (in Figure 6.3, select COM 1 or other COM port instead of “TCP/IP (Winsock)”). Set the COM port Properties to be the same as those set for the Serial Port 1 of the converter.



(Figure 6.3)

Data Transmission

When all steps described above are finished, type any characters on the COM Port Terminal and check if the typed characters are also displayed on the TCP/IP Winsock Terminal. Alternatively, check if the characters typed on the TCP/IP Winsock Terminal are also displayed on the COM Port Terminal. If yes, then all settings are correct and the converter can operate properly.

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Appendix A

FAQ

Q. Why can't the ETM.exe detect the converter on the network?

A. Please check

- if the power is properly plugged to the converter.
- if the network cable is properly connected between the converter and the Hub.

Refer to the "Hardware Installation" steps in Chapter 3.

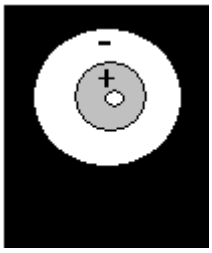
Q. Why can't I use IE to setup the converter?

A. Please check if the network domain of your PC is the same as that of the converter.

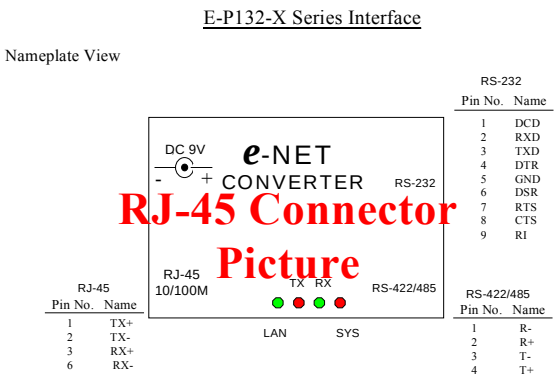
Appendix B

Pin outs and Cable Wiring

DC-In Jack

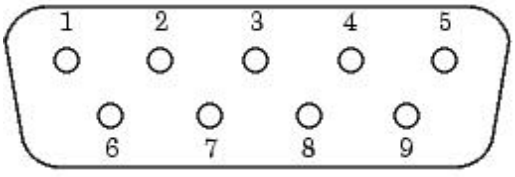


RJ-45 Pin Assignment



RS-232 Pin Assignment

The pin assignment scheme for a 9-pin male connector on a DTE is given below.



PIN 1 : N/A PIN 2 : RXD PIN 3 : TXD PIN 4 : N/A

PIN 5 : GND PIN 6 : N/A PIN 7 : RTS PIN 8 : CTS

PIN 9 : N/A

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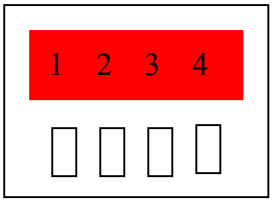
RS-232 Wiring Diagram

Serial Device		e-NET Converter	
2	RX	3	TX
3	TX	2	RX
5	GND	5	GND
7	RTS	8	CTS
8	CTS	7	RTS

RS-422 Pin Assignment

The pin assignment scheme for a 4-pin RS-422 is given below.



PIN 1 : R- PIN 2 : R+ PIN 3 : T- PIN 4 : T+

RS-422 Wiring Diagram

Serial Device	e-NET Converter	
R-	3	T-
R+	4	T+
T-	1	R-
T+	2	R+

RS-485 Wiring Diagram

Serial Device	e-NET Converter			
R- T-	1	R-	3	T-
R+ T+	2	R+	4	T+

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Appendix C

Troubleshooting Guide

Appendix D

Firmware Upgrade

As the firmware of the converter always keeps on enhancing with latest technologies and network standards, if your applications need the latest release of firmware, you will receive a Win32 executable utility and a ROM binary file to upgrade the converter firmware through network:

1. Set the target converter to have IP address in the same subnet as your host computer.
2. In the DOS Prompt environment of Windows, execute the upgrade utility eUpg32.exe, with the ROM file name you received as the first parameter and the target converter IP address as the optional second parameter. For example:

   eUpg32 ROM. bin 10.0.0.123

   If you omit the target IP address, the upgrade software will try to find one automatically.
3. The upgrade will start immediately with percent finished displayed on screen. Wait until 100% complete. Please note during upgrade, do not stop the software or remove the power of the converter, or it will cause permanent damage of firmware and can not be recovered.